Chem 121 Test-Topic Review

CHAPTER 22

Study Guide

Key Concepts

22.1 Hydrocarbons

- Because carbon has four valence electrons, carbon atoms always form four covalent bonds.
- The carbon atoms in an alkane can be arranged in a straight chain or in a chain that has branches.
- Molecules of hydrocarbons, such as alkanes, are nonpolar molecules.

22.2 Unsaturated Hydrocarbons

- At least one carbon-carbon bond in an alkene is a double bond. Other bonds may be single carbon-carbon and carbon-hydrogen bonds.
- At least one carbon-carbon bond in an alkyne is a triple bond. Other bonds may be single or double carbon-carbon bonds and single carbon-hydrogen bonds.

22.3 Isomers

- Structural isomers differ in physical properties and have different chemical reactivites.
- Two types of stereoisomers are geometric isomers and optical isomers.

22.4 Hydrocarbon Rings

- Some hydrocarbon compounds have a carbon chain that is in the form of a ring.
- In a benzene molecule, the bonding electrons between carbon atoms are shared evenly around the ring.

22.5 Hydrocarbons From Earth's Crust

- Natural gas is an important source of alkanes of low molar mass.
- The refining of petroleum starts with the distillation of petroleum into fractions according to boiling point.
- Coal consists largely of condensed aromatic compounds of extremely high molar mass. These compounds have a high proportion of carbon compared with hydrogen.

Vocabulary

- aliphatic hydrocarbons (p. 703)
- alkanes (p. 694)
- alkenes (p. 702)
- alkyl group (p. 698)
- alkynes (p. 703)
- aromatic compound (p. 710)
- asymmetric carbon (p. 705)
- branched-chain alkane (p. 698)
- *cis* configuration (p. 705)
- condensed structural formulas (p. 696)
- cracking (p. 713)
- cyclic hydrocarbon (p. 709)
- homologous series (p. 695)
- hydrocarbons (p. 693)
- geometric isomers (p. 705)
- isomers (p. 704)
- optical isomers (p. 706)
- saturated compounds (p. 702)
- stereoisomers (p. 705)
- straight-chain alkanes (p. 695)
- structural isomers (p. 704)
- substituent (p. 697)
- *trans* configuration (p. 705)
- unsaturated compounds (p. 702)

Be sure to study common aromatic structures as well as ortho, meta and para isomers. Also phenyl and benzyl

- saturated compounds (p. 702)
- stereoisomers (p. 705)
- straight-chain alkanes (p. 695)
- structural isomers (p. 704)
- substituent (p. 697)
- *trans* configuration (p. 705)
- unsaturated compounds (p. 702)